

## PATENT ABSTRACTS OF JAPAN

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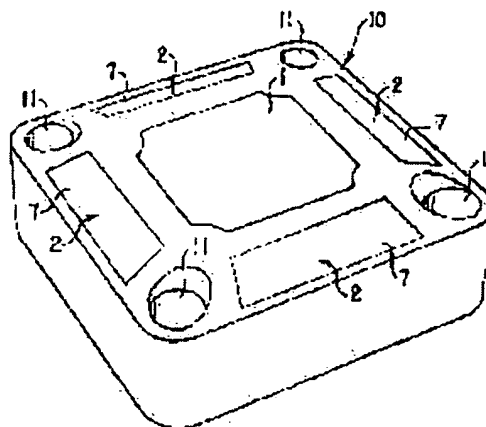
(72)Inventor : SUZUKI KANJI

## (54) ROAD INSTALLATION TYPE ROAD SIGNAL DEVICE

## (57)Abstract:

PROBLEM TO BE SOLVED: To promote durability by embedding a lighting lense for a solar cell and flood lifting lenses for light emission diodes into a device main body by insert molding.

SOLUTION: One lighting lense 1, four flood lenses 2 and four assembling nuts are respectively arranged to required positions of a metal mold to make insert molding of them from a synthetic resin such as polycarbonate, etc., and a device main body 10 having assembling bolt insertion holes 11 in four corners is formed. A solar cell is stuck on the lower surface of the lighting lense 1, at the same time, light emission diodes are arranged in recesses provided to the lower parts of the flood lighting lenses 2, and solar cell, light emission diodes, battery, etc., are connected to them. Then, the device main body 10 is stored in a synthetic resin box body embedded in the ground, bolts are screwed in nuts from the assembling bolt insertion holes 11, and a road installation type road signal device is formed.



## LEGAL STATUS

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CLAIMS

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[Claim(s)]

[Claim 1] The road surface installation mold route signalling device characterized by having faced fabricating the body of equipment made of synthetic resin, and laying the lighting lens for solar batteries, and the floodlighting lens for light emitting diodes underground in this body of equipment by insert molding at least.

[Claim 2] The road surface installation mold route signalling device according to claim 1 whose synthetic resin which fabricates the body of equipment is a polycarbonate.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the route signalling device which it is laid underground and installed [ signalling device ] in a road surface and makes light emitting diode emit light with a solar battery at night.

[0002]

[Description of the Prior Art] Light emitting diode is built in as the light source, and the route signalling device used laying under the road surface is known by JP,4-36206,B to which this invention person invented previously and a special permission was granted for him, JP,4-58841,B, JP,4-58842,B, etc.

[0003] The route signalling device shown in the above-mentioned periodical at drawing 11 and drawing 12 is illustrated. In this drawing, the box of the abbreviation square with which a is laid underground in the earth, and b are the bodies of equipment made from aluminum dies casting, and come to allot the lighting lens j and a solar battery c in the center of a top face of this body b of equipment. On all sides [ of the body b of equipment / perimeter ], flange d is formed at one, the reflector k made of synthetic resin and light emitting diode e, the floodlighting lens l, etc. are formed in this flange d, and it enables it to emit a signal beam of light to a perimeter four way type. In addition, the battery by which f was supported by the body b bottom of equipment and an electronic-circuitry substrate, the O-ring for watertight seals by which h was prepared in the upper bed opening edge of Box a, and g are bolts which are \*\*\*\*(ed) by the corner of flange d and have fixed this flange d to Box a. This signalling device is laid under this hole in Box a so that a square hole may be dug in a road surface and the underside of flange d may wear on a road surface i.

[0004]

[Problem(s) to be Solved by the Invention] By the way, although it had prevented storm sewage etc. trespassing upon the interior by filling up the clearance around the lighting lens j, and the clearance around Reflector k with a silicon sealant in the signalling device of the above-mentioned conventional structure Since it changed greatly with seasons, seal nature was destroyed, storm sewage invaded and road surface temperature caused failure in many cases, when the load of an automobile repeated on the coefficient of thermal expansion accompanying the temperature change, etc. weatherability, or the body b of equipment and deformed into it.

[0005]

[Means for Solving the Problem] This invention tends to offer the road surface installation mold route signalling device with which the above-mentioned technical problem is solved and with which seal nature is highly durable. Therefore, the road surface installation mold route signalling device of this invention is characterized by having faced fabricating the body of equipment made of synthetic resin, and laying the lighting lens for solar batteries, and the floodlighting lens for light emitting diodes underground in this body of equipment by insert molding at least. In addition, it is appropriate to specifically use a polycarbonate as the above-mentioned synthetic resin.

[0006]

[Embodiment of the Invention] Next, 1 operation gestalt of this invention is explained with a drawing. The abbreviation square tabular lighting lens 1 fabricated by one with synthetic resin or glass transparent to drawing 1 is shown. moreover, drawing 2 -- coloring -- the floodlighting lens 2 fabricated by one with transparent synthetic resin or colored glass is shown. As shown also in drawing 3 and drawing 4 , as for this floodlighting lens 2, the concave pit 4 which the optical axis can set so that it may become with vertical top Mukai is formed in the lower part in light emitting diode 3. While inserting the plating plate 6 made to reflect in the front upper part the light which had inclined back forward at the include angle of 45 or less degrees to the vertical plane, and was emitted to it from this light emitting diode 3 to this floodlighting lens 2 It comes to form the radial plane 7 ahead emitted so that the light which had inclined in the anterior part forward at the include angle of 45 or less degrees

to the level surface, and was reflected in it by said plating plate 6 may be made refracted and it may crawl on earth surface.

[0007] A deer is carried out, in this invention, it faces fabricating the body 10 of equipment with synthetic resin, such as a polycarbonate, insert molding of one lighting lens 1, four floodlighting lenses 2, and the four nuts 9 of \*\* with a group as shown in drawing 5 is arranged and carried out to the necessary location of a molding die, respectively, and this each lighting lens 1, the floodlighting lens 2, and a nut 9 are laid underground into the synthetic resin of this body 10 of equipment.

[0008] The body 10 of equipment of a flat-surface abbreviation square fabricated in this way by drawing 6 is shown. In addition, 11 is the \*\* bolt insertion hole with a group established by the four-corners section. The road surface installation mold route signalling device assembled by drawing 7 - drawing 10 from this body 10 of equipment is shown. The solar battery which stuck 12 on the underside of the lighting lens 1, and 13 are the rectangular frame-like wiring substrates with which a total of eight light emitting diodes 3 were attached in the top face among drawing, and this wiring substrate 13 is arranged in the floodlighting lens 2 bottom so that light emitting diode 3 may face all over a concave pit 4. The solar battery 12, the flowing connector 14, and a battery 15 and the flowing connector 16 are prepared in this wiring substrate 13, and also IC17 which constitutes the charge circuit which charges a battery 15 with the electromotive force of the solar battery 12 of day ranges, the flash circuit which makes night blink light emitting diode 3 with the power of \*\*\*\*\* 15 is mounted.

[0009] The battery 15 was held by the bottom plate 18, and this bottom plate 18 has attached the perimeter firmly to the underside of the body 10 of equipment by screwing a bolt 19 in a nut 9. In addition, 20 is the O-ring made of rubber prepared in order to be prepared in the underside of the body 10 of equipment by the inside of a nut 9 and to maintain seal nature with a bottom plate 18.

[0010] 21 is a box made of the synthetic resin of the abbreviation square laid underground in the earth, it holds the above-mentioned body 10 of equipment into this box 21, and assembly completes it by using as the screw hole 23 of the bottom four corners in this box 21 the bolt 22 inserted in the \*\* bolt insertion hole 11 with a group with a screwing bundle.

[0011]

[Effect of the Invention] thus, since it comes out, the road surface installation mold route signalling device of this invention can mass-produce the thing of high quality which was excellent in \*\*\*\*\* and seal nature in the trouble of the assembly which there is no possibility of having made and carrying out insert molding of a lighting lens and the floodlighting lens to the body of equipment and that a clearance may be generated around these lenses, therefore is filled up with a sealant like before by low cost. And there is useful effectiveness of decreasing fear of generating of failure by trespass of storm sewage, and raising endurance. In addition, as synthetic resin which fabricates the body of equipment, weatherability, the up one on the strength, etc. to a polycarbonate is the optimal.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the route signalling device which it is laid underground and installed [ signalling device ] in a road surface and makes light emitting diode emit light with a solar battery at night.

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PRIOR ART

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EFFECT OF THE INVENTION

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[Effect of the Invention] thus, since it comes out, the road surface installation mold route signalling device of this invention can mass-produce the thing of high quality which was excellent in \*\*\*\*\* and seal nature in the trouble of the assembly which there is no possibility of having made and carrying out insert molding of a lighting lens and the floodlighting lens to the body of equipment and that a clearance may be generated around these lenses, therefore is filled up with a sealant like before by low cost. And there is useful effectiveness of decreasing fear of generating of failure by trespass of storm sewage, and raising endurance. In addition, as synthetic resin which fabricates the body of equipment, weatherability, the up one on the strength, etc. to a polycarbonate is the optimal.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] By the way, although it had prevented storm sewage etc. trespassing upon the interior by filling up the clearance around the lighting lens j, and the clearance around Reflector k with a silicon sealant in the signalling device of the above-mentioned conventional structure Since it changed greatly with seasons, seal nature was destroyed, storm sewage invaded and road surface temperature caused failure in many cases, when the load of an automobile repeated on the coefficient of thermal expansion accompanying the temperature change, etc. weatherability, or the body b of equipment and deformed into it.

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MEANS

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[Means for Solving the Problem] This invention tends to offer the road surface installation mold route signalling device with which the above-mentioned technical problem is solved and with which seal nature is highly durable. Therefore, the road surface installation mold route signalling device of this invention is characterized by having faced fabricating the body of equipment made of synthetic resin, and laying the lighting lens for solar batteries, and the floodlighting lens for light emitting diodes underground in this body of equipment by insert molding at least. In addition, it is appropriate to specifically use a polycarbonate as the above-mentioned synthetic resin.

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[Embodiment of the Invention] Next, 1 operation gestalt of this invention is explained with a drawing. The abbreviation square tabular lighting lens 1 fabricated by one with synthetic resin or glass transparent to drawing 1 is shown. moreover, drawing 2 -- coloring -- the floodlighting lens 2 fabricated by one with transparent synthetic resin or colored glass is shown. As shown also in drawing 3 and drawing 4, as for this floodlighting lens 2, the concave pit 4 which the optical axis can set so that it may become with vertical top Mukai is formed in the lower part in light emitting diode 3. While inserting the plating plate 6 made to reflect in the front upper part the light which had inclined back forward at the include angle of 45 or less degrees to the vertical plane, and was emitted to it from this light emitting diode 3 to this floodlighting lens 2 It comes to form the radial plane 7 ahead emitted so that the light which had inclined in the anterior part forward at the include angle of 45 or less degrees to the level surface, and was reflected in it by said plating plate 6 may be made refracted and it may crawl on earth surface.

[0007] A deer is carried out, in this invention, it faces fabricating the body 10 of equipment with synthetic resin, such as a polycarbonate, insert molding of one lighting lens 1, four floodlighting lenses 2, and the four nuts 9 of \*\* with a group as shown in drawing 5 is arranged and carried out to the necessary location of a molding die, respectively, and this each lighting lens 1, the floodlighting lens 2, and a nut 9 are laid underground into the synthetic resin of this body 10 of equipment.

[0008] The body 10 of equipment of a flat-surface abbreviation square fabricated in this way by drawing 6 is shown. In addition, 11 is the \*\* bolt insertion hole with a group established by the four-corners section. The road surface installation mold route signalling device assembled by drawing 7 - drawing 10 from this body 10 of equipment is shown. The solar battery which stuck 12 on the underside of the lighting lens 1, and 13 are the rectangular frame-like wiring substrates with which a total of eight light emitting diodes 3 were attached in the top face among drawing, and this wiring substrate 13 is arranged in the floodlighting lens 2 bottom so that light emitting diode 3 may face all over a concave pit 4. The solar battery 12, the flowing connector 14, and a battery 15 and the flowing connector 16 are prepared in this wiring substrate 13, and also IC17 which constitutes the charge circuit which charges a battery 15 with the electromotive force of the solar battery 12 of day ranges, the flash circuit which makes night blink light emitting diode 3 with the power of \*\*\*\*\* 15 is mounted.

[0009] The battery 15 was held by the bottom plate 18, and this bottom plate 18 has attached the perimeter firmly to the underside of the body 10 of equipment by screwing a bolt 19 in a nut 9. In addition, 20 is the O-ring made of rubber prepared in order to be prepared in the underside of the body 10 of equipment by the inside of a nut 9 and to maintain seal nature with a bottom plate 18.

[0010] 21 is a box made of the synthetic resin of the abbreviation square laid underground in the earth, it holds the above-mentioned body 10 of equipment into this box 21, and assembly completes it by using as the screw hole 23 of the bottom four corners in this box 21 the bolt 22 inserted in the \*\* bolt insertion hole 11 with a group with a screwing bundle.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The perspective view of the lighting lens of the road surface installation mold route signalling device concerning this invention.

[Drawing 2] The perspective view of the floodlighting lens of the road surface installation mold route signalling device concerning this invention.

[Drawing 3] The perspective view of the floodlighting lens of drawing 2 .

[Drawing 4] The bottom view of the floodlighting lens of drawing 2 .

[Drawing 5] The perspective view of an embedded nut.

[Drawing 6] The perspective view of the body of equipment of the road surface installation mold route signalling device concerning this invention.

[Drawing 7] Drawing of longitudinal section of the road surface installation mold route signalling device concerning this invention.

[Drawing 8] The A-A line sectional view of drawing 7 .

[Drawing 9] The B-B line sectional view of drawing 7 .

[Drawing 10] The perspective view of the road surface installation mold route signalling device concerning this invention.

[Description of Notations]

- 1 Lighting Lens
- 2 Floodlighting Lens
- 3 Light Emitting Diode
- 4 Concave Pit
- 6 Plating Plate
- 7 Radial Plane
- 9 Nut
- 10 Body of Equipment
- 12 Solar Battery
- 13 Wiring Substrate
- 15 Battery
- 18 Bottom Plate
- 19 Bolt
- 21 Box
- 22 Bolt

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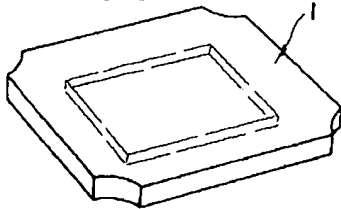
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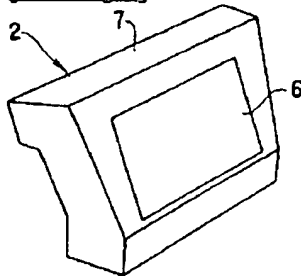
DRAWINGS

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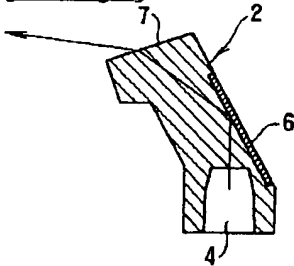
[Drawing 1]



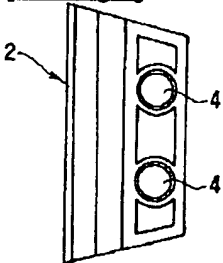
[Drawing 2]



[Drawing 3]



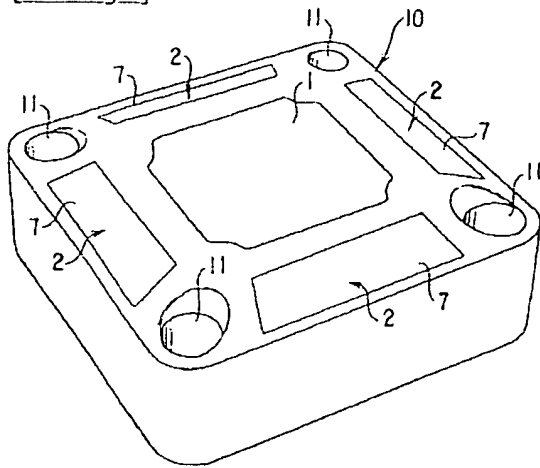
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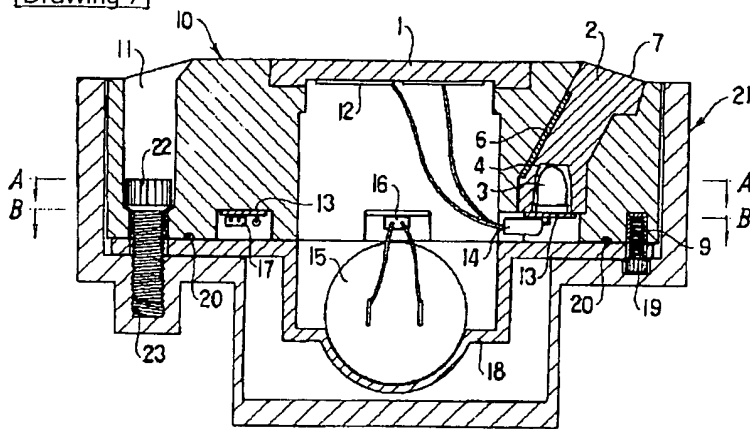
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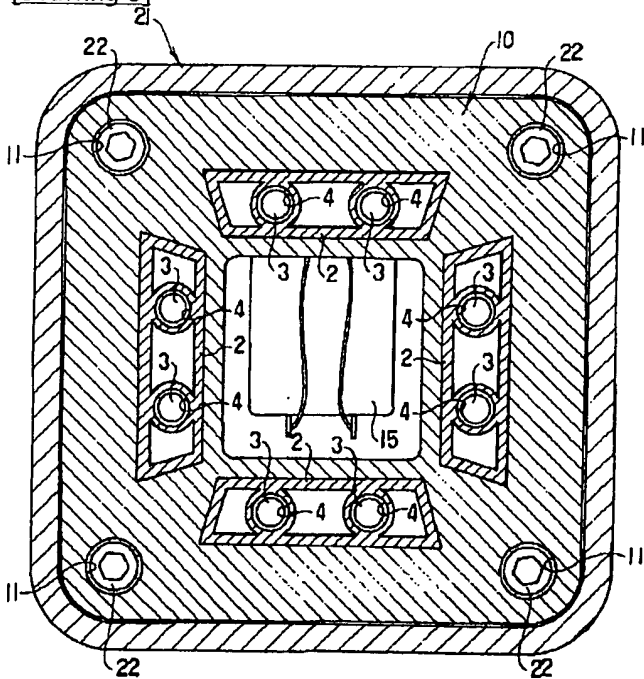
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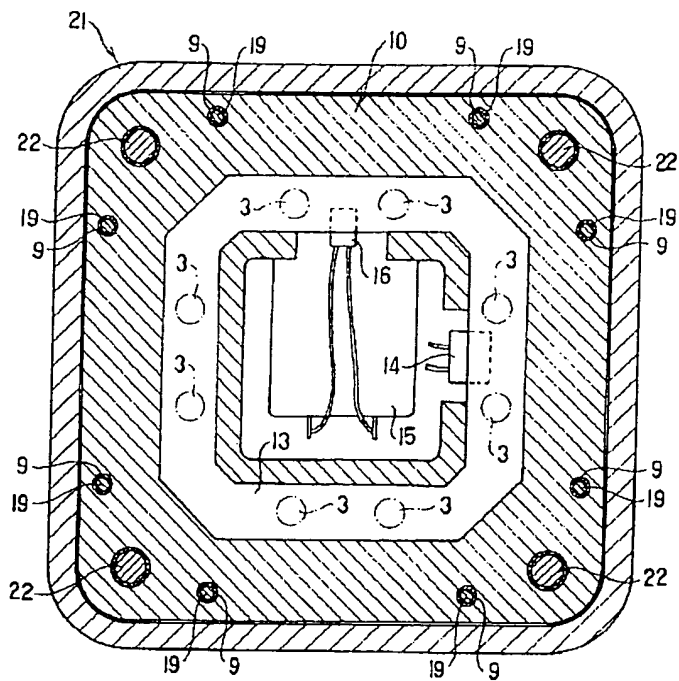
[Drawing 7]



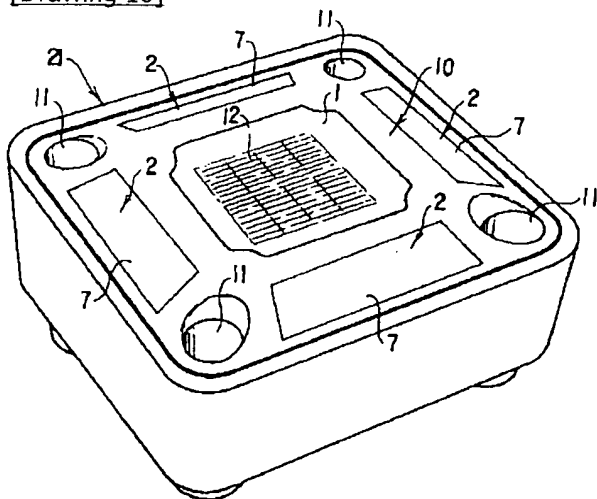
[Drawing 8]



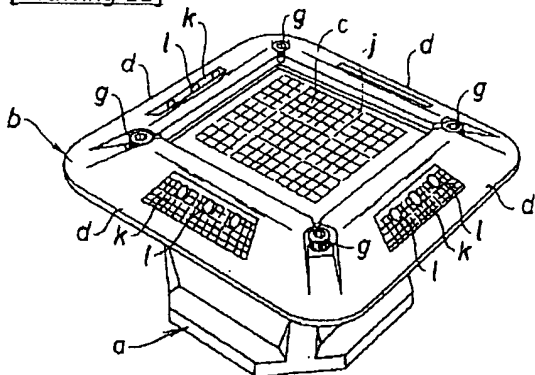
[Drawing 9]



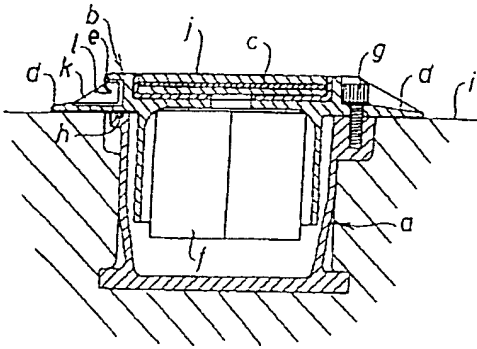
[Drawing 10]



[Drawing 11]



[Drawing 12]



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WRITTEN AMENDMENT

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[Procedure amendment]

[Filing Date] November 30, Heisei 7

[Procedure amendment 1]

[Document to be Amended] Description

[Item(s) to be Amended] Easy explanation of a drawing

[Method of Amendment] Modification

[Proposed Amendment]

[Brief Description of the Drawings]

[Drawing 1] The perspective view of the lighting lens of the road surface installation mold route signalling device concerning this invention.

[Drawing 2] The perspective view of the floodlighting lens of the road surface installation mold route signalling device concerning this invention.

[Drawing 3] The perspective view of the floodlighting lens of drawing 2 .

[Drawing 4] The bottom view of the floodlighting lens of drawing 2 .

[Drawing 5] The perspective view of an embedded nut.

[Drawing 6] The perspective view of the body of equipment of the road surface installation mold route signalling device concerning this invention.

[Drawing 7] Drawing of longitudinal section of the road surface installation mold route signalling device concerning this invention.

[Drawing 8] The A-A line sectional view of drawing 7 .

[Drawing 9] The B-B line sectional view of drawing 7 .

[Drawing 10] The perspective view of the road surface installation mold route signalling device concerning this invention.

[Drawing 11] The perspective view of the conventional road surface installation mold route signalling device.

[Drawing 12] Drawing of longitudinal section of drawing 11 .

[Description of Notations]

1 Lighting Lens

2 Floodlighting Lens

3 Light Emitting Diode

4 Concave Pit

6 Plating Plate

7 Radial Plane

9 Nut

10 Body of Equipment

12 Solar Battery

13 Wiring Substrate

15 Battery

18 Bottom Plate

19 Bolt

21 Box

22 Bolt

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